

Remarkable Effect of Heat 275

negative, it became more positive, but only to the degree of

deflecting the needle 16° . Then, *motion* of the platinum (907) facilitated the passing of the current and the deflection increased, but *heating* the platinum side did far more.

912. *Silver and copper* in dilute sulphuric acid produced very little effect; the copper was positive about 1° by the galvanometer; moving the copper or the silver did nothing; heating the copper side caused no change; but on heating the silver side it became negative 20° . On cooling the silver side this effect went down, and then, either moving the silver or copper, or heating the copper side, caused very little change; but heating the silver side made it negative as before.

913. All this revolves itself into an effect of the following kind; that where two metals are in the relation of positive and negative to each other in such an electrolyte as dilute acids (and perhaps others), heating the negative metal at its contact with the electrolyte enables the current, which tends to form, to pass with such facility, as to give a result sometimes tenfold more powerful than would occur without it. It is not displacement of the investing fluid, for motion will in these cases do nothing; it is not chemical action, for the effect occurs at that electrode where the chemical action is not active; it is not a thermo-electric phenomenon of the ordinary kind, because it depends upon a voltaic relation; *i.e.* the metal showing the effect must be negative to the other metal in the electrolyte; so silver heated does nothing with silver cold, though it shows a great effect with copper either hot or cold (912); and platinum hot is as nothing to platina cold, but much to silver either hot or cold.

914. Whatever may be the intimate action of heat in these cases, there is no doubt that it is dependent on the current which tends to pass round the circuit. It is essential to remember that the increased effect on the galvanometer is not due to any increase in the electromotive force, but solely to the removal of obstruction to the current by an increase probably of discharge. M. de la Rive has

described an effect of heat, on the passage of the electric current, through dilute acid placed in the circuit, by platinum electrodes. Heat applied to the negative electrode increased the deflection of a galvanometer needle in the circuit, from 12° to 30° or 45°; whilst heat applied to the positive electrode caused no change.¹ I have not been able to obtain this nullity of effect at the positive electrode

¹ *Bibliothèque Universelle*, 1837, vii. 388.